

## Randall M. Dole

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### Selected Publications

Dole, R., and coauthors, 2013: The Making of an Extreme Event: Putting the Pieces Together. *Bull. Amer. Meteor. Soc.*, in press, doi:[10.1175/BAMS-D-12-00069.1](https://doi.org/10.1175/BAMS-D-12-00069.1).

Vose, R. and coauthors 2013: Monitoring and Understanding Changes in Extremes: Extratropical Storms, Winds and Waves. *Bull. Amer. Meteor. Soc.*, 94, doi:[10.1175/BAMS-D-12-00162.1](https://doi.org/10.1175/BAMS-D-12-00162.1).

Peterson, T. C., and Coauthors, 2013: Monitoring and Understanding Changes in Heat Waves, Cold Waves, Floods, and Droughts in the United States: State of Knowledge. *Bull. Amer. Meteor. Soc.*, **94**, 821–834, doi:[10.1175/BAMS-D-12-00066.1](https://doi.org/10.1175/BAMS-D-12-00066.1).

Hoerling, M., A., Kumar, R. Dole, J. Nielsen Gammon, J. Eischeid, J. Perlwitz, X. Quan, T. Zhang, P. Pegion, and M. Chen, 2013: Anatomy of an Extreme Event. *J. Climate*, **26**, 2811–2832, doi:[10.1175/JCLI-D-12-00270.1](https://doi.org/10.1175/JCLI-D-12-00270.1).

Stott, P. A., M. Allen, N. Christidis, R. M. Dole, M. Hoerling, C. Huntingford, P. Pall, J. Perlwitz, and D. Stone. 2013. Attribution of weather and climate-related events. In: *Climate Science for Serving Society: Research, Modeling and Prediction Priorities*, Eds. G. R. Asrar, J. W. Hurrell, Springer Science+Business Media, Dordrecht 307-337, doi: [10.1007/978-94-007-6692-1\\_12](https://doi.org/10.1007/978-94-007-6692-1_12).

Hoerling, Martin P., Jon K. Eischeid, Xiao-Wei Quan, Henry F. Diaz, Robert S. Webb, Randall M. Dole, David R. Easterling, 2012: Is a Transition to Semipermanent Drought Conditions Imminent in the U.S. Great Plains? *J. Climate*, **25**, 8380–8386, doi:[10.1175/JCLI-D-12-00449.1](https://doi.org/10.1175/JCLI-D-12-00449.1).

Galarneau, T., T. Hamill, R. Dole, and J. Perlwitz, 2012: A Multi-Scale Analysis of the Extreme Weather Events over Western Russia and Northern Pakistan During July 2010. *Mon. Wea. Rev.*, 140, 1639–1664, doi:[10.1175/MWR-D-11-00191.1](https://doi.org/10.1175/MWR-D-11-00191.1).

Dole, R., M. Hoerling, J. Perlwitz, J. Eischeid, P. Pegion, T. Zhang, X.-W. Quan, T. Xu, and D. Murray, 2011: Was there a basis for anticipating the 2010 Russian heat wave? *Geophys. Res. Lett.*, **38**, L06702, doi:[10.1029/2010GL046582](https://doi.org/10.1029/2010GL046582).

Legler, D. and R.M. Dole, 2011: Evaluation of reanalyses—developing an Integrated Earth System Analysis (IESA) Capability. *EOS Trans. AGU*, **92**, (20) 172, doi:[10.1029/2011EO200006](https://doi.org/10.1029/2011EO200006).

Liebmann, B., R. M. Dole, C. Jones, I. Bladé, and D. Allured, 2010: Influence of choice of time period on global surface temperature trend estimates, *Bull. Amer. Meteor. Soc.*, **91**, 1485-1491, doi:[10.1175/2010BAMS3030.1](https://doi.org/10.1175/2010BAMS3030.1).

Brunet, G., M. Shapiro, B. Hoskins, M. Moncrieff, R. Dole, G. Kiladis, B. Kirtman, A. Lorenc, B. Mills, R. Morss, S. Polavarapu, D. Rogers, J. Schaake, and J. Shukla, 2010: Collaboration of the weather and climate communities to advance subseasonal-to-seasonal prediction, *Bull. Amer. Meteor. Soc.*, **91**, 1397-1406, doi:[10.1175/2010BAMS3013.1](https://doi.org/10.1175/2010BAMS3013.1).

Shapiro, M., J. Shukla, G. Brunet, C. Nobre, M. Béland, R. Dole, et al., 2010: An Earth-System Prediction Initiative for the Twenty-first Century. *Bull. Amer. Meteor. Soc.*, **91**, 1377–1388, doi:[10.1175/2010BAMS2944.1](https://doi.org/10.1175/2010BAMS2944.1).

Trenberth, K.E., R. Dole, Y. Xue, K. Onogi, R. Dee, M. Balmaseda, M. Bosilovich, S. Schubert, W. Large, 2010: Atmospheric reanalyses: [A major resource for ocean product development and modeling](#). In proceedings: "OceanObs'09: Sustained Ocean Observations and Information for Society" Conference (Vol. 2), Venice, Italy, 21-25 September 2009, Hall, J., Harrison D.E. and Stammer, D., eds., ESA Publication WPP-306.

Solomon, S., R. Dole, R. Feely, I. Held, W. Higgins, J. Payne, E. Shea, U. Varanasi, and M. Westley, 2009: A vision for climate services in NOAA. *Fisheries*, **34**, 607-609, doi:[10.1577/1548-8446-34-12](https://doi.org/10.1577/1548-8446-34-12).

Dole, R.M., 2008: Linking Weather and Climate. *Meteor. Monogr.*, **33**, No. 55, 297-348, doi:[10.1175/0065-9401-33.55.297](https://doi.org/10.1175/0065-9401-33.55.297).

Waliser, D., K. Weickmann, R. Dole, S. Schubert, O. Alves, C. Jones, M. Newman, H.-L. Pan, A. Roubicek, S. Saha, C. Smith, H. Van den Dool, F. Vitart, M. Wheeler, and J. Whitaker, 2006: The Experimental MJO Prediction Project. *Bull. Amer. Meteor. Soc.*, **87**, 425-431, doi:[10.1175/BAMS-87-4-425](https://doi.org/10.1175/BAMS-87-4-425).

Pulwarty, R.S., K.L. Jacobs, and R.M. Dole, 2005: The hardest working river: Drought and critical water problems in the Colorado River Basin. In: [Drought and Water Crises: Science, Technology, and Management Issues](#). D.A. Wilhite, ed., Marcel Dekker, Inc. New York, NY. pp. 249-286.

Hamill, T.M., R.S. Schneider, H.E. Brooks, G.S. Forbes, H.B. Bluestein, M. Steinberg, D. Melendez, and R.M. Dole, 2005: The May 2003 Extended Tornado Outbreak. *Bull. Amer. Meteor. Soc.*, **86**, 531-542, doi:[10.1175/BAMS-86-4-531](https://doi.org/10.1175/BAMS-86-4-531).

Hamill, T.M., R. Schneider, H.E. Brooks, G. Forbes, H. Bluestein, M. Steinberg, D. Melendez, and R. Dole, 2005: Supplement to the May 2003 Extended Tornado Outbreak: Daily Maps. *Bull. Amer. Meteor. Soc.*, **86**, ES3-ES16, doi:[10.1175/BAMS-86-4-HamillA](https://doi.org/10.1175/BAMS-86-4-HamillA).

Dole, R. M., 2003: "Predicting climate variations in the American West: What are our prospects?" *Water and Climate in the Western United States*. W.M. Lewis Jr., ed., University Press of Colorado, Boulder, CO, pp. 9-28.

Chen, P., M.P. Hoerling and R.M. Dole, 2001: The origin of the subtropical anticyclones. *J. Atmos. Sci.*, **58**, 1827-1835, doi:[10.1175/1520-0469\(2001\)058<1827:TOOTSA>2.0.CO;2](https://doi.org/10.1175/1520-0469(2001)058<1827:TOOTSA>2.0.CO;2).

Dole, R.M., 2000: "Prospects for Drought Forecasts in the United States." In: *Droughts: A Global Assessment*. D. A. Wilhite, ed., Routledge Publishers, London. Volume 1: pp. 83-99.

Black, R.X., and R.M. Dole, 2000: Storm tracks and barotropic deformation in climate models. *J. Climate*, **13**, 2712-2728, doi:[10.1175/1520-0442\(2000\)013<2712:STABDI>2.0.CO;2](https://doi.org/10.1175/1520-0442(2000)013<2712:STABDI>2.0.CO;2).

Wolter, K., R.M. Dole, and C.A. Smith, 1999: Short-term climate extremes over the continental United States and ENSO. Part I: Seasonal temperatures. *J. Climate*, **12**, 3255-3272, doi:[10.1175/1520-0442\(1999\)012<3255:STCEOT>2.0.CO;2](https://doi.org/10.1175/1520-0442(1999)012<3255:STCEOT>2.0.CO;2).

Cai, M., R.M. Dole, K.L. Paine, and J.S. Whitaker, 1996: Dynamics of systematic errors in the NMC Medium Range Forecast Model. *Mon. Wea. Review*, **124**, 265-276, doi:[10.1175/1520-0493\(1996\)124<0265:DOSEIT>2.0.CO;2](https://doi.org/10.1175/1520-0493(1996)124<0265:DOSEIT>2.0.CO;2).

Dole, R.M., 1996: "Blocking." In: *Encyclopedia of Climate and Weather*. Oxford University Press, New York, NY, 10016, pp. 93-99.

Lyon, B.F., and R.M. Dole, 1995: A diagnostic comparison of the 1980 and 1988 U.S. summer heat wave-droughts. *J. Climate*, **8**, 1658-1675, doi:[10.1175/1520-0442\(1995\)008<1658:ADCOTA>2.0.CO;2](https://doi.org/10.1175/1520-0442(1995)008<1658:ADCOTA>2.0.CO;2).

Whitaker, J.S. and R.M. Dole, 1995: Organization of storm tracks in zonally varying flows. *J. Atmos. Sci.*, **52**, 1178-1191, doi:[10.1175/1520-0469\(1995\)052<1178:OOSTIZ>2.0.CO;2](https://doi.org/10.1175/1520-0469(1995)052<1178:OOSTIZ>2.0.CO;2).

Dole, R.M., J.S. Whitaker, and K.L. Paine, 1994: Mechanisms for storm track variability. Part I: Diagnostic studies. In: *The Life Cycles of Extratropical Cyclones*. S. Gronas and M.A. Shapiro, Eds. Bergen, Norway, Vol. II, ISBN: 8241901437, pp. 12-17.

Whitaker, J.S., R.M. Dole, and K.L. Paine, 1994: Mechanisms for storm track variability. Part II: Model studies. In: *The Life Cycles of Extratropical Cyclones*. S. Gronas and M. A. Shapiro, eds., Bergen, Norway, Vol. II, ISBN: 8241901437, pp. 97-101.

Black, R.X., and R.M. Dole, 1993: The dynamics of large-scale cyclogenesis over the North Pacific Ocean. *J. Atmos. Sci.*, **50**, 421-442, doi:[10.1175/1520-0469\(1993\)050<0421:TDOLSC>2.0.CO;2](https://doi.org/10.1175/1520-0469(1993)050<0421:TDOLSC>2.0.CO;2).

Nielsen, J.W., and R.M. Dole, 1992: A survey of extratropical cyclone characteristics during GALE. *Mon. Wea. Rev.*, **120**, 1156-1167, doi:[10.1175/1520-0493\(1992\)120<1156:ASOECC>2.0.CO;2](https://doi.org/10.1175/1520-0493(1992)120<1156:ASOECC>2.0.CO;2).

Engholm, C.D., E.R. Williams and R.M. Dole, 1990: Meteorological and electrical conditions associated with positive cloud-to-ground lightning. *Mon. Wea. Rev.*, **118**, 470-487, doi:[10.1175/1520-0493\(1990\)118<0470:MAECAW>2.0.CO;2](https://doi.org/10.1175/1520-0493(1990)118<0470:MAECAW>2.0.CO;2).

Dole, R.M., and R.X. Black, 1990: Life cycles of persistent anomalies. Part II: The development of persistent negative height anomalies over the North Pacific Ocean. *Mon. Wea. Rev.*, **118**, 824-846, doi:[10.1175/1520-0493\(1990\)118<0824:LCOPAP>2.0.CO;2](https://doi.org/10.1175/1520-0493(1990)118<0824:LCOPAP>2.0.CO;2).

Dole, R.M., 1989: Life cycles of persistent anomalies. Part I: Evolution of 500-mb height fields. *Mon. Wea. Rev.*, **117**, 177-211, doi:[10.1175/1520-0493\(1989\)117<0177:LCOPAP>2.0.CO;2](https://doi.org/10.1175/1520-0493(1989)117<0177:LCOPAP>2.0.CO;2).

Dole, R.M., 1987: Persistent large-scale flow anomalies. Part I: Characteristics of developments. In: *The Nature and Prediction of Extratropical Weather Systems*. European Centre for Medium Range Weather Forecasts, Reading, England. Volume II. pp. 27-72.

Dole, R.M., 1987: Persistent large-scale flow anomalies, Part II: Relationships to variations in synoptic-scale eddy activity and cyclogenesis. *The Nature and Prediction of Extratropical Weather Systems*. European Centre for Medium Range Weather Forecasts, Reading, England. Volume II, pp. 73-122.

Dole, R.M., 1986: The life cycles of persistent anomalies and blocking over the North Pacific. *Advances in Geophysics: Anomalous atmospheric flows and blocking*, Academic Press, Inc., Orlando, **29**, 31-69.

Dole, R.M., 1986: Persistent anomalies of the extratropical Northern Hemisphere wintertime circulation: Structure. *Mon. Wea. Rev.*, **114**, 178-207, doi:[10.1175/1520-0493\(1986\)114<0178:PAOTEN>2.0.CO;2](https://doi.org/10.1175/1520-0493(1986)114<0178:PAOTEN>2.0.CO;2).

Dole, R.M., and N.D. Gordon, 1983: Persistent anomalies of the extratropical Northern Hemisphere wintertime circulation; geographical distribution and regional persistence characteristics. *Mon. Wea. Rev.*, **111**, 1567-1586, doi:[10.1175/1520-0493\(1983\)111<1567:PAOTEN>2.0.CO;2](https://doi.org/10.1175/1520-0493(1983)111<1567:PAOTEN>2.0.CO;2).

Dole, R.M., 1983: Persistent anomalies of the extratropical Northern Hemisphere wintertime circulation. In: *Large-Scale Dynamical Processes in the Atmosphere*, B.J. Hoskins and R.P. Pearce, eds., Academic Press, NY, 95-109.

Dole, R.M., and N.D. Gordon, 1983: Asymmetries in persistence between positive and negative anomalies in persistent anomaly regions. *Predictability of Fluid Motions*, G. Holloway and B.J. West, eds., Am. Inst. of Physics, NY, 181-204.

### ***U.S. and Interagency Research Program Reports***

Dole, R.M., M. Hoerling and S. Schubert, eds., 2008: [Reanalysis of Historical Climate Data for Key Atmospheric Features: Implications for Attribution of Causes of Observed Change](#).

A Report by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research. National Oceanic and Atmospheric Administration, National Climatic Data Center, Asheville, NC. 136 pp.

Schubert, S., R. Dole, H. van den Dool, M. Suarez, and D. Waliser, 2002: *Prospects for improving forecasts of weather and short-term climate variability on subseasonal (2-week to 2-month) time scales*. [NASA/TM-2002-104606](#), vol. 23, 171 pp.

### ***NOAA Internal Reports***

“[Strengthening NOAA Science: Findings from the NOAA Science Workshop](#)”. April 20-22, 2010. Prepared by the NOAA Science Workshop Program Committee, P. Sandifer and R. Dole, co-chairs. 61 pp.

“[Toward Advancing Understanding and Predictions of Regional Climate Variations and Change](#)”. Prepared for the NOAA Research Council following the NOAA Science Challenge Workshop Sept. 20-22, 2011. R. Dole, chair. 32 pp.

### ***Oral Presentations (past two years)***

2013 “The Making of an Extreme Event: Putting the Pieces Together”. European Meteorological Society Annual Conference, Reading, UK.

2013 “The Making of an Extreme Event: Putting the Pieces Together”. Invited presentation, U.S. CLIVAR Workshop on Analyses, Dynamics and Modeling of Large Scale Meteorological Patterns Associated with Extreme Temperature and Precipitation.

2012 “Identifying the Causes of Weather and Climate Events to Improve Predictions”. Invited keynote presentation, NOAA 37<sup>th</sup> Annual Climate Diagnostics and Prediction Workshop, Fort Collins, CO.

2012 “Framing Event Attribution”. Invited presentation, Workshop on Attribution of Climate and Weather Extremes: Assessing, Anticipating and Communicating Climate Risks. Oxford UK.

2012 “Challenges in Attribution of Weather and Climate Extremes”, Invited presentation, University of Colorado Center for Science and Technology Policy. Boulder CO.

- 2012 "Physically-based Attribution of Weather and Climate Extremes", Invited presentation, Banff Workshop on Frontiers in Detection and Attribution of Climate Change. Banff Canada.
- 2012 "Challenges in Attribution of Weather and Climate Extremes", Invited presentation, NCAR Advanced Study Summer Colloquium The Weather-Climate Intersection: Advances and Challenges, Boulder, CO.
- 2011 "Was There a Basis for Anticipating the 2010 Russian Heat Wave?" Invited presentation, American Meteorological Society Annual Conference. Seattle, WA.
- 2011 "Understanding the Causes for the 2010 Russian Heat Wave: Implications for Extreme Heat Wave Predictions and Projections", Invited presentation, International Union of Geodesy and Geophysics Conference. Melbourne, Australia.
- 2011 "Linking Weather and Climate", Invited opening presentation, World Climate Research Programme Open Science Conference. Denver, CO.